SET-A

PRE BOARD EXAMINATION 2020

Date: 16/12/2020

Subject: Mathematics   **Time: 3 Hours**

Subject Code: 041   **Max. Marks: 80**

General Instructions:

1. This question paper contains two parts A and B.

2. Both Part A and Part B have internal choices.

Part – A:

1. It consists two sections I and II.

2. Section I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

3. Section II has 4 questions on case study. Each case study has 5 case-based sub-parts. An examinee is to attempt any 4 out of 5 sub-parts.

Part – B:

1. Question No 21 to 26 are Very short answer Type questions of 2 marks each.
2. Question No 27 to 33 are Short Answer Type questions of 3 marks each.
3. Question No 34 to 36 are Long Answer Type questions of 5 marks each.
4. Internal choice is provided in 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks.
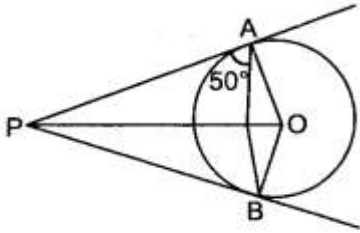
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PART- A

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Section-I Sections I has 16 questions of 1 mark each. Internal choice is provided in 5 questions.

| 1 | Has the rational number $\dfrac{441}{2^2.5^7.7^2}$, a terminating or a non-terminating decimal representation? | 1 |

	OR	
	Given that LCM (91, 26) = 182, then HCF (91, 26) is..........................	
2	If the sum of zeroes of the quadratic polynomial $3x^2 - kx + 6$ is 3, then find the value of k.	1
3	Find the value of 'k' for which the system of equations have infinitely many solutions. $x - ky = 2$; $3x + 6y = -5$.	1
4	Find whether the following pair of linear equations is consistent or inconsistent: 3x + 2y = 8 6x – 4y = 9	1
5	Find the 9th term from the end (towards the first term) of the A.P. 5, 9,13............,185. **OR** For what value of k will k + 9,2k -1 and 2k + 7 are the consecutive terms of an A.P.?	1
6	If 1 is a root of the equations $ay^2 + ay + 3 = 0$ and $y^2 + y + b = 0$, then find the value of ab.	1
7	Find the sum of the AP: 1,3,5,...............199.	1
8	From an external point P, tangents PA and PB are drawn to a circle with centre O. If ∠PAB = 50°, then find ∠AOB. 	1
9	Find the length of the tangent drawn from a point 8 cm away from the center of a circle of radius 6 cm. **OR** If radii of two concentric circles are 4cm and 5cm, find the length of each chord of one circle which is tangent to the other circle.	1
10	If ΔABC ~ ΔPQR, perimeter of ΔABC = 32 cm, perimeter of ΔPQR = 48 cm and PR = 6 cm, then find the length of AC. **OR** ΔABC ~ ΔDEF. If AB = 4 cm, BC = 3.5 cm, CA = 2.5 cm and DF = 7.5 cm, find the perimeter of ΔDEF.	1

11	To divide a line segment AB in the ratio 5:7, what is the minimum number of points marked on a ray AX at equal distances?	1
12	If 3 cos A = 1, find the value of cosec A.	1
13	If $(1 + \cos A)(1 - \cos A) = \frac{3}{4}$, find the value of sec A.	1
14	If area and circumference of a circle are numerically equal , find area of the circle.	1
15	Volume of two spheres are in the ratio 64: 27. Find the ratio of their surface areas.	1
16	20 tickets, on which numbers 1 to 20 are written, are mixed thoroughly and then a ticket is drawn at random out of them. Find the probability that the number on the drawn ticket is a multiple of 3 or 7.	1

OR

A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.

Section- II
Case study questions are compulsory. Attempt any four subparts of each question. Each subpart carries 1 mark.

17	**ICE-CREAM SHOP**	4

This is the floor plan for Mari's Ice-cream Shop. She is renovating the shop. The service area is surrounded by the serving counter.

Note:

Each square on the grid represents

2 metres x 2 metres.

A) Refer the figure: Consider O as the origin and identify the coordinates of point T.
i) (10,4)   ii) (4, 8)   iii) (4,10)   iv) (2,2)

B) Find the distance of the point F from the y-axis.

i) 12m   ii) 4m   iii) 10m   iv) 2m

C) The distance between the points T and F is

i) 5 m   ii) 15m   iii) 10m   iv) 4m

D) Mari wants to put new edging along the outer edge of the counter. What is the total length of edging she needs?

i) 18m   ii) 20m   iii) 24m   iv) 10m

E) If Mary wants to arrange the seating area equidistant from all four corners P,Q,R and S, then what will be the position of the seating area?

i) (14,20)   ii) (30,0)   iii)) (30,20)   iv) (22,10)

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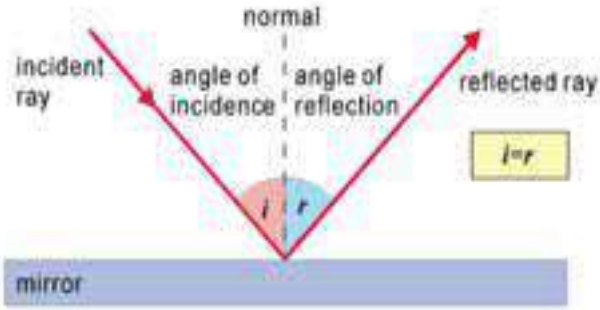
Ramesh places a mirror on level ground to determine the height of a pole (with traffic light fired on it). He stands at a certain distance so that he can see the top of the pole reflected from the mirror. Ramesh's eye level is 1.5 m above the ground. The distance of Ramesh and the pole from the mirror are 1.2 m and 6 m respectively.
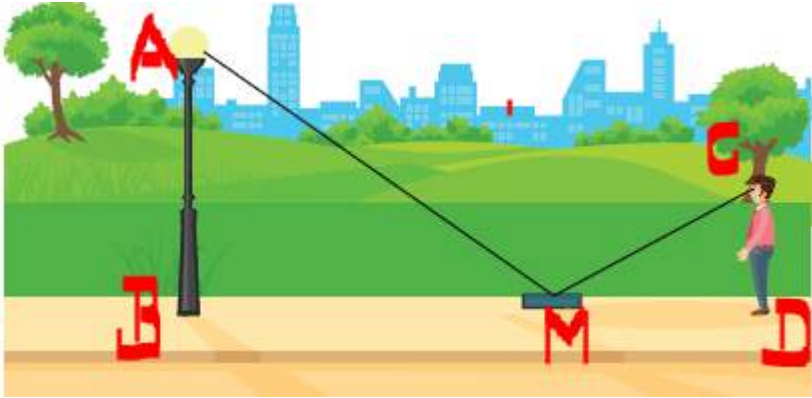
On the basis of the above information, answer any four of the following questions:

A) Which criterion of similarity is applicable to similar triangles ABM & CDM ?

i) ASA   ii) AA   iii) SSS   iv) None of these

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B) What is the height of the pole?
(i) 4.8m   (ii) 6.2m   (iii) 7.5m   (iv) None of these

C) If angle of incidence is 30^0 , what is the measure of ∠CMD ?
i) 90^0 ii) 30^0 iii) 60^0 iv) 120^0

D) $\frac{ar\ \Delta ABM}{ar\ \Delta CDM}$ = ...

i) $\frac{(AB)^2}{(CD)^2}$ ii)) $\frac{AB}{CD}$ iii)) $\frac{(BM)^2}{(CD)^2}$ iv)) $\frac{(AM)^2}{(CD)^2}$

E) Now Ramesh move behind such that distance between pole and Ramesh is 12 meters. He place mirror between him and pole to see the reflection of light in right position. What is the distance between mirror and Ramesh ?
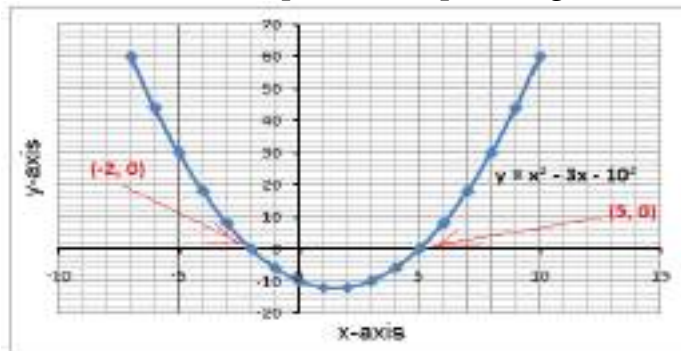i)   13.2m   ii) 6 m   iii) 10m   iv) 2m

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Fig - 1

Fig - 2
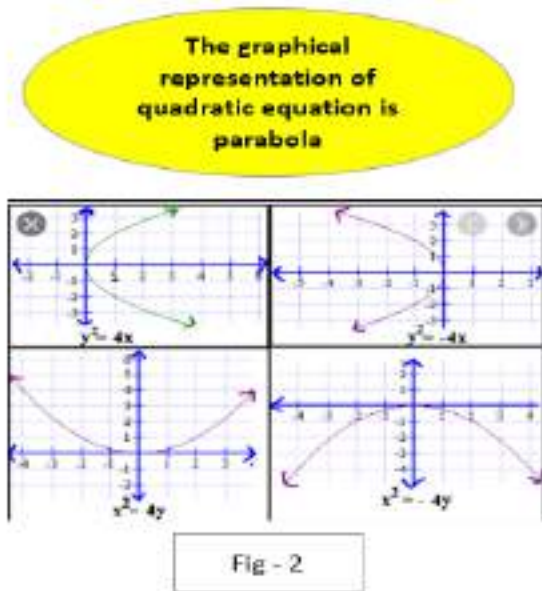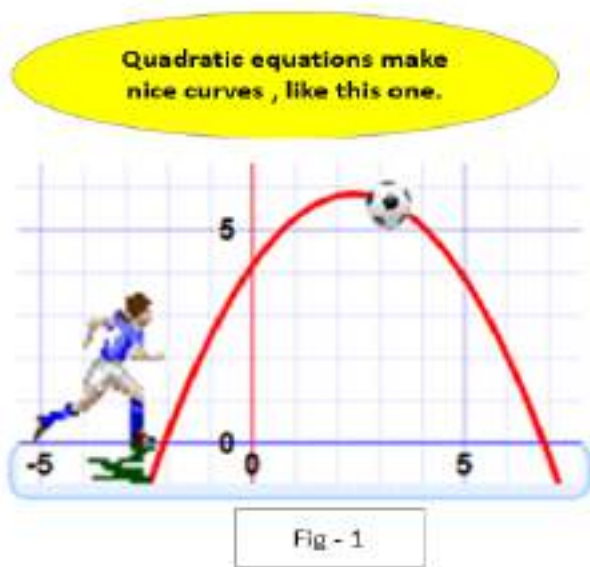
A) Which of the following algebraic equation may represent the parabola in Fig-1 ?
i) – $x^2+3x – 3 =0$.   ii) $x+3 = 2(x-1)$ iii)) $x^3- 3 =0$.   iv)) $x^2+2x -8 = x^2+ 3$

B) The parabola cuts the x-axis two points: Then the number roots of the quadratic equation is :
   i)   1   ii) 2   iii)0   iv)None of these

C) The roots of the quadratic equation given in the figure is :

i) 0&0   ii) -2 & 0   iii) -2 & 5   iv) 5&0

D) Which of the following equations has -1 as a root?

i) $x^2 + 3x - 10 = 0$ ii) $x^2 - x - 12 = 0$ iii) $3x^2 - 2x - 5 = 0$ iv) $9x^2 + 24x + 15 = 0$

E) Which of the following equations has no real root?

i) $x^2 - 4x + 3\sqrt{2} = 0$ ii) $x^2 + 4x - 3\sqrt{2} = 0$ iii) $x^2 - 4x - 3\sqrt{2} = 0$ iv) $3x^2 + 4\sqrt{3}x + 4 = 0$

20   The Kendriya Vidyalaya Sangathan is a system of premier central government schools in India that are instituted under the aegis of the Ministry of Education (MHRD), Government of India. As of October 2020, it has a total of 1239 schools. It is one of the world's largest chains of schools. The system came into being in 1963 under the name 'Central Schools'. Later, the name was changed to Kendriya Vidyalaya. It is a non profit organisation. Its schools are all affiliated to the Central Board of Secondary Education (CBSE). The objective of KVS is to cater to the educational needs of the children of transferable Central Government employees including Defence and Para-Military personnel by providing a common programme of education.
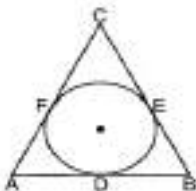

Commissioner of Regional office Jaipur preapare a table of the marks obtained of 100 students which is given below:

Marks	0-20	20-40	40-60	60-80	80-100
No.of students	15	18	21	29	17

   A) Find the modal class.
      i) 0-20   ii) 60- 80   iii) 40-60   iv) 80-100

   B) The median class is:

i)   0 -20   ii) 60 - 80   iii) 40-60   iv) 80- 100

C) How many students scored minimum 60 marks?
    i)   54   ii) 21   iii) 62   iv) 46

D) The mode of this data is:
    i)   68   ii) 58   iii) 62   iv) 65

E) If the pass mark is 40 how many students failed?
    i) 33   ii)54   iii) 21   iv) 46

Part –B
Section III
All questions are compulsory. In case of internal choices, attempt any one.

21	Two tankers contain 850 litres and 680 litres of petrol respectively. Find the maximum capacity of a container which can measure the petrol of either tanker in exact number of times.	2
22	Show that the points (-2,3) (8,3) and (6, 7) are the vertices of a right triangle. **OR** Find the value of k, if the point P(2,4) is equidistant from the points A(5, k) and B(k, 7).	2
23	Form a quadratic polynomial whose zeroes are 3 + √2 and 3 – √2.	2
24	Draw a circle of radius 5cm. Take two points P and Q on one of its diameters extended on both sides, each at a distance of 7cm on opposite sides of its centre. Draw tangents to the circle from these two points P and Q.	2
25	If $\sin\theta + \cos\theta = \sqrt{2}$, then evaluate : $\tan\theta + \cot\theta$. **OR** In an acute angled triangle ABC, sin (A+B) = 1 and tan (B −A) = √3, then find the values of A and B .	2
26	In given figure, a circle is inscribed in a ΔABC, such that it touches the sides AB, BC and CA at points D, E and F respectively. If the lengths of sides AB, BC and CA are 12 cm, 8 cm and 10 cm respectively, find the lengths of AD, BE and CF 	2

Section IV

27	Show that (√3+√5)² is an irrational number.	3
28	If the sum of first 7 terms of an A.P. is 49 and that of its first 17 terms is 289, find the sum of first	3

terms of the A.P

OR

An A.P consists of 60 terms. If the first and the last terms be 7 and 125 respectively, find the 32ⁿᵈ term.

29	In figure, O is the centre of a circle such that diameter AB = 13 cm and AC = 12 cm. BC is joined. Find the area of the shaded region.	3
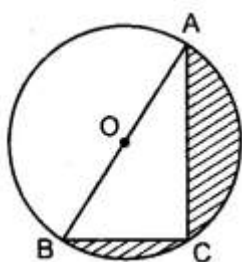
30	Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.	3

OR

$\triangle ABC \sim \triangle PQR$. AD is the median to BC and PM is the median to QR. Prove that $\dfrac{AB}{PQ} = \dfrac{AD}{PM}$

31	Three different coins are tossed together. Find the probability of getting	3

1. exactly two heads
2. at least two heads
3. at most two tails.

32	As observed from the top of a 75 m high light house from the sea level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.	3

33	If the mean of the following distribution is 54, find the missing frequency x:	3

Class	0–20	20–40	40–60	60–80	80–100
Frequency	16	14	24	26	x

34	A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5m. From a point on the ground the angles of elevation of the top and the bottom of the flagstaff are 60⁰ and 30⁰ respectively. Find the height of the tower and the distance of the point from the tower.	5

| 35 | From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm thickness. Find the length of the wire. | 5 |

OR

A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherical lead balls are dropped into the vessel. One-fourth of the water flows out of the vessel. Find the radius of a spherical ball.

| 36 | Draw the graphs of following equations:
$2x - y = 1; x + 2y = 13$ | 5 |

Find the solution of the equations from the graph and shade the triangular region formed by the lines and the y-axis.